

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Electrical grounding and electric shock protection		Code 1010311361010315993
Field of study Electrical Engineering	Profile of study (general academic, practical) general academic	Year /Semester 3 / 6
Elective path/specialty Power Networks and Electric Power System	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: - Project/seminars: -		No. of credits 1
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: dr hab. inż. Ryszard Batura email: ryszard.batura@put.poznan.pl tel. 665-2787 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965		Responsible for subject / lecturer: mgr inż. Aleksandra Schött email: aleksandra.schott@put.poznan.pl tel. 665-2581 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has a basic knowledge of the impact of electricity on the human body and the criteria for protection against electrical shock. The student has a basic knowledge of design, construction and principles of operation electrical equipment.
2	Skills	Student is able to operate electrical equipment in accordance with occupational health and safety.
3	Social competencies	Student is aware of the importance of activities in electrical engineering and associated consequences of these actions.
Assumptions and objectives of the course: The aim of the course is to acquaint students with various types of grounding, which are used in electricity grids and buildings. In addition, students will be familiarized with the requirements of groundings, how they are design and construction of typical solutions. An important aim of the course is to educate students in the area health and safety at work as an electrical engineer.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. The student has knowledge of the design, construction and operating principles of electrical equipment - [K_W08 ++] 2. The student has a basic knowledge needed to understand the social, economic, legal and other non-technical considerations of engineering, knows the basic principles of ergonomics, health and safety and hazards that may exist in the electrical industry - [K_W19 +] 3. The student has knowledge of the basics the power system, including the structure and manufacturing sector operating conditions, transmission and distribution of electricity; know the the basic principles of operation of the power system elements - [K_W24 ++]		
Skills: 1. Students apply principles of health and safety - [K_U21 ++] 2. Student is able to properly operate the electrical equipment in accordance with the overall requirements and technical documentation - [K_U23 ++]		
Social competencies: 1. The student recognizes the importance and understand the various aspects and effects of electrical engineering activities, including the impact on the environment and the associated responsibility for decisions - [K_K02 ++]		

Assessment methods of study outcomes		
Assessment of the knowledge and skills during the the written exam of an problematic nature. Bonuses: activity and quality perception.		
Course description		
Content of the lecture: 1) Types of earthing and tasks performed by them. 2) Earthing in low voltage systems: functional and protective. 3) protective Earthing in high voltage networks. 4) Requirements for groundings. 5) The rules for calculating earthing. 6) Constructions of earth-electrode networks.		
Basic bibliography: 1. K. Wołokowiński: Uziemienia urządzeń elektroenergetycznych, WNT, Warszawa, 1972 2. H. Markiewicz: Bezpieczeństwo w elektroenergetyce, WNT, Warszawa, 2009 3. W. Hoppel: Sieci średnich napięć, PWN, Warszawa, 2017		
Additional bibliography: 1. PN-EN 63164. Instalacje elektryczne. 2. PN-EN 50522. Uziemienie instalacji elektroenergetycznych prądu przemiennego o napięciu wyższym niż 1 kV. 3. PN-EN 50341. Elektroenergetyczne linie napowietrzne prądu przemiennego powyżej 1 kV		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lecture classes	15	
2. Participation in consultation with the lecturer	5	
3. Exam preparation	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	25	1
Contact hours	20	1
Practical activities	0	0